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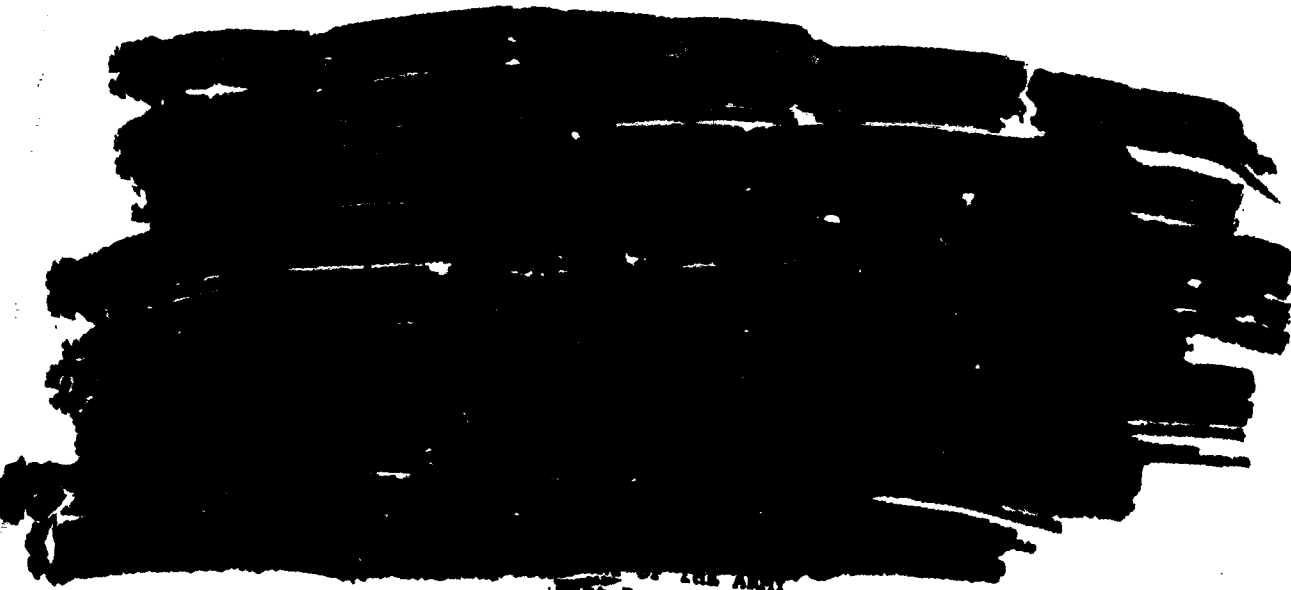
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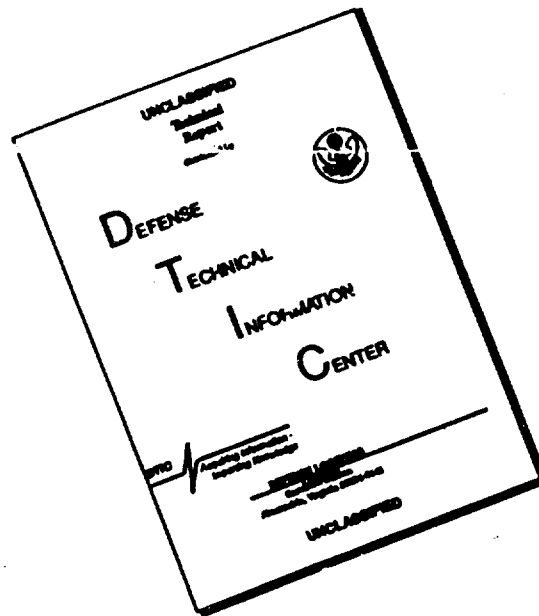
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## CASE OF FOOT-AND-MOUTH DISEASE IN MAN

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Jadwiga Schwann

During the epizootic period and particularly panzootic period of hoof-and-mouth disease, workers engaged in cattle raising are almost constantly in contact with diseased cattle, yet there are disproportionately few cases where man is affected by the disease as compared to the epidemic proportion of the disease among animals. For example, Waldman and Röhrer emphasize the fact that persons studying the disease at the institute on the Riems Island where the vaccine is produced were very rarely affected by the foot-and-mouth disease. However, during every epizootic period of foot and mouth disease there are isolated cases or a larger number of cases where people are infected by the disease. These people do not always seek medical assistance and are not included in the data published in medical or veterinary literature. Many authors (Stühmer, Schonfeld) state that in order to determine the presence of foot and mouth disease, it is indispensable to show that the virus was transmitted from the contents of the bladder of saliva of a man to a guinea pig, to show that the virus is present in those fluids, or to show the presence of antibodies in the blood serum of a sick person. It should be emphasized at the same time that if blisters are absent on the scarified paw of a guinea pig it does not exclude the possibility that the disease is present, because it is not always possible to infect a guinea pig. It depends to a great extent on the virulence of the virus with regard to the guinea pig. On the other hand, many cases of the disease involving changes of the character of the blister and septic conditions may have a different etiology. In addition to dermatological infections which are different from the foot-and-mouth disease, such as erythema exudativum multiforme, dermatitis ex usu bromi, jodistomatitis Baederi, septicæmia hæmorrhagica, we also must consider the possibility of infections

such as stomatitis vesiculosa contagiosa equi, acne contagiosa equi, exanthema coitale vesiculosum equi, bovis, which are also transmitted to man through contact. Their symptoms are changes of drainage with pus-forming inflammation of lacteal glands, or serious cases of blister rash caused by another virus, which form deep and painful ulcers with tallow at the bottom, or covered with pseudo-diphtheric coating, as emphasized by Koelsch. According to the reports, the most frequent way of infection is the consumption of milk and its products, then the transmission of the virus by hands from the excreta and refuse of the diseased animals to the buccal cavity as a result of smoking while at work, or through eating by hands which have been infected. This is understandable in view of the dermo-epitheliotropic properties of the virus which is characterized by strong affinity to the epithelium of the buccal cavity, the inside of the cheeks, tongue, and also to the mucous membrane of the nasal cavity and sex organs.

Those who are most exposed to the infection are workers who are employed close to diseased animals such as cow-barn overseers, milkers, shepherds, and also veterinary workers who must carry out a number of activities when they take care of sick animals. When infection takes place in this way, the first blister appears at the place where the infection penetrated in, namely on a hand, and then there may be no blisters at all on the mucous membrane of the buccal cavity.

The typical clinical picture and course of foot-and-mouth disease in man is as follows: after the incubation period, which is very short in the case of man, for it lasts three to eight days (but it may take as long as eighteen days), usually four days, the patient gets a high fever with chills. The fever subsides soon, but there appear changes in the buccal cavity in the form of reddening of the mucous membrane and small blisters. The blisters may also appear on the conjunctiva, tongue, mucous membrane of sex organs. In addition, similar blisters appear on the skin on the inside of fingers and toes. Hangnails are one of the very frequent phenomena of the disease. Another very characteristic symptom is salivation which occurs right from the beginning of the disease. At the same time there is a feeling of dryness in the buccal cavity as well as general phenomena such as headache and dizziness, general weakness, complete lack of thirst, nausea, belching, pains in swallowing, fetor ex ore, pains in all members. Some authors (Waldman, Pape, Koelsch, Kumer) emphasize the two stages of the clinical course of the foot-and-mouth disease both in man as well as in animal. They claim that first there is a local primary effluorescence at the place where

the virus penetrated in (lips, mouth, fingers and toes), which is accompanied by a slight increase of temperature, and then the temperature increases again and is accompanied by an intensification of the general symptoms during the second stage of the disease. The patients report frequently that they suffer afflictions of the heart, accelerated heart-beat, stitches, and there is also swelling of the lacteal glands. All these symptoms indicate that the disease has spread as a result of the fact that the virus penetrated in internal organs. In its mildest form the foot-and-mouth disease takes a course of about two weeks. However, there are various complications, particularly with regard to children who are afflicted more heavily, and at the same time there appear frequently symptoms of inflammation of the digestive tract. Sieluzyski (1955) described such a case of foot and mouth disease of the septic type in the case of a 14-year old boy. Makow described the symptoms of foot and mouth disease in the case of a 19-year old boy, a veterinary orderly. The virus damaged his heart muscle (myocarditis acuta). There are also cases where the patient dies, such as for example the case of a child described by Gibbon, or another case of a child described by Zürn.

As a rule there are no difficulties to diagnose the disease in cases which offer a typical clinical picture of symptoms which appear during the epizootic period. But there are many cases where the course of the disease is not typical. The disease assumes various forms in man, so that in some cases a correct diagnosis is possible only when we learn about simultaneous epizooty of livestock and make a biological test on a guinea pig or a serological study of the secretion of a diseased bladder.

The heterogeneous gamut of clinical reactions is characteristic of foot-and-mouth disease in man. It does not depend only on the virulence of the virus which causes the given epizooty. There are clinical cases where the buccal cavity is affected, but there are no general symptoms and no simultaneous changes on hands and feet. The amount of rash varies, because it may be limited to individual blisters or swellings of the nail walls, and sometimes there is a widespread speckled and clotted rash. However, as a rule the lack of rash on face, extremities (with the exception of the palm and foot) and on the thorax is a characteristic feature of foot-and-mouth disease. Some authors also described hemorrhaging rash (Schultz). Sometimes, when there is little skin rash, there are no blisters in the buccal cavity. Sometimes the disease takes its course without any fever. The case of Trautwein (1929) is interesting from this point of view. It refers to a 25-year old oxherd, who lived on the Riems Island. He stabbed himself with a knife when he handled the animals

and so was infected with foot-and-mouth disease. The course of the disease in the case of this patient was very light, the general symptoms were reduced to a minimum, and blisters were limited only to the skin of his fingers and toes. During the entire period there were no changes in the mucous membranes and there was no fever at all. The diagnosis was confirmed by the subsequent appearance of inoculation in the content of blisters on guinea pigs. It was caused by a virus of the "B" type.

Literature contains few descriptions of cases of foot-and-mouth disease caused exclusively by skin infection. In addition to Trautwein, Magnusson in Sweden described three cases of foot-and-mouth disease among milkers at the time of epizooty caused by the "O" type infection caused by the scratching of skin. Material obtained from three patients was inoculated on guinea pigs and from one patient on a swine. On the basis of interviews it was determined that raw milk did not play any role in that case and that the infection was caused by contact of hands and mouth with infected material. Parnas also described cases of occupational infection by foot-and-mouth disease. These referred to five people, three of whom were employees of state farm-. The patients showed general symptoms and also skin changes on fingers and toes and around nails. The attempt failed to inoculate guinea pigs with the virus isolated from material obtained from these patients.

#### My Own Case

I observed another case of foot-and-mouth disease in man caused through professional contact and exclusively through skin infection. I observed the case of O.O. at the outpatient clinic for skin and venereal diseases at Choszczno. The patient was 42 years old and was employed in one of the state farms for eight years as a cow-barn overseer.

On 19 March 1963 the patient reported to the consultation office for skin and venereal diseases at Choszczno. He stated that foot-and-mouth disease was discovered on 7 March in the State Farm in which he worked. The enzootic disease affected most of the cows on the farm and all calves. The infectious disease spread on 14 March to swine and caused great losses. During the first days of the enzootic disease the infected cows were isolated from healthy cows and the patient named above was given the job of looking after them. In addition to him there were six milkers in the cow barn. None of the women got sick. It should also be emphasized that none of the six children of the patient were infected. The patient stated that during the period of the enzootic disease he took eight newborn calves from the diseased cows

and that all these calves died. Two days before he was afflicted by the disease he took a newborn calf from a diseased cow. During the same period he handled the sick animals and held them by their nostrils while he was milking them. He did the job without using gloves, and did not pay attention to a small cut on the thumb of his right hand. The patient emphasized the fact that during the entire period of the enzootic disease he did not drink any raw milk. Two days later he began to have strong headaches and dizzy spells, chills, did not feel any thirst, and felt very weak. On the third or fourth day after the assumed infection he felt burning and itching on his hands, and right after that there appeared small white blisters which were preceded by the appearance of small red spots. At the present moment he also feels itching around the toes of his right foot. The patient washed his hands in a solution of supermanganate of potassium. This did not bring any relief, but on the contrary the general symptoms increased. Among diseases which he had previously he mentions stomach ulcer, for which he was operated on twice, and appendectomy which was performed in 1958.

During examination he gave the impression of a seriously ill person, although his general temperature was slightly higher (37.8). I found that the conjunctiva were slightly inflamed, the buccal cavity and lips were dry, there was no saliva and no blisters of any kind in the buccal cavity. On the other hand, I found on the skin on the top of both hands numerous blisters of the size of lentils which formed lines (figure 1, 2) and came together in the form of traces along the longitudinal axis of the fingers. The blisters are semicircular, glossy, hard and filled with a liquid, they are white and yellow and of a similar color as the surrounding skin. The surrounding area of some of the blisters is inflamed. The area of the nails is generally free from any pathological changes. On the palms of both hands there are less numerous blisters which seem to be bloated. They reach the average size of a 10-grosz piece. The blisters contain purulent substance and therefore are opaque (figure 3, 4). The skin is hard, and as a result most of the blisters are located deeper and hardly show on the surface. They shine through the thick skin in the form of red specks. Slightly above the bend of the thumb of the right hand there is a shallow lessening of the outer skin which is covered with a fresh scab. The scab is surrounded by a hem of reddish skin (figure 4). Individual red speckles are scattered in the form of lines in the skin, slightly above the carpus, but not extending over its upper boundary line. Generally speaking, the changes on hands do not differ basically from the changes found in mycosis of the palm or ordinary pyoderma. A swelling appears on the skin of the



toe on the right foot, and the area of the free edge of the nail is slightly reddened.

The mucous membrane of the external sex organs is not affected. Lacteal glands are not swollen.

The patient was sent to the department for skin diseases of the Specialized Voivodship Hospital at Szczecin, where he stayed for two weeks.

Additional examination after the patient's arrival to the hospital: O. B. 4/8 mm, urine: C, fiber 1027, albumen: 003 o/oo, sugar (-), in the deposit: leucocytes 30-60 in the field of vision, erythrocytes: 5-8 in the field of vision, increased urobilinogen. Chest X ray without change, electrocardiogram without change. Brucellosis test (Wright reaction performed at the department of microbiology of the Polish Academy of Sciences at Szczecin) in blood serum negative. Serological examination of the blood serum of the patient was carried out at the Department of Foot and Mouth Disease of the Veterinarian Institute at Zdunska Wola by Docent T. Kobusiewicz. A supplementary reaction revealed the presence of a virus of the foot and mouth disease of the "C" type. According to the studies of Baranowski, Kobusiewicz and others, the virus is characteristic of the terrain of the Szczecin Voivodship.

On 19 March I injected the fluid from the blisters of the patient in the scarified skin of three guinea pigs. This resulted in a primary blister in one of the guinea pigs within 24 hours after the test, and a secondary blister on another non-scarified paw after 72 hours (figure 5). These changes did not disturb the general health condition of the animals or their appetite. There were no further changes in the animals. No secondary blisters appeared on the remaining two guinea pigs.

While the patient stayed at the hospital, his body temperature remained normal during the entire period. But there was salivation, stitches around the heart, and pains in groin glands. Changes of the skin disappeared very fast, the blisters dried out, some broke open, and the blistered areas healed within a few days. At the same time there appeared sporadically new isolated speckles and white blisters on the hands, but during the entire period there were no blisters in the buccal cavity.

The above description indicates that the case was different from the typical clinical picture of foot-and-mouth disease, primarily because the characteristic blisters did not show on the mucous membrane of the buccal cavity and there was no fever. The course of the disease is strikingly similar to the case of Trautwein, and in both cases the diagnosis could be confirmed only on the basis of additional results of a biological test on a guinea pig and of a serological study. This corresponds to the claim of

Schonfeld, who states that the foot-and-mouth disease in man can resemble ordinary pyoderma, and from the clinical point of view it could also resemble all those features of the disease which are usually reported in textbooks which show the different forms of the disease, but the diagnosis must be confirmed by a biological test and a serological study.

It should be ascertained that foot-and-mouth disease in man is a typical occupational disease of workers who attend cattle. Since even small and unobserved injuries of the skin may constitute an opening through which the germ may penetrate, we should pay great attention to the fact that hygienic conditions should be strictly observed, especially with regard to the protection of hands when the worker takes care of cattle which has foot-and-mouth disease.

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Author's address: Dr. Med. Jadwiga Schwann, Szczecin, Warynskiego Street 6.

FIGURE APPENDIX



Figure 1. Blisters on the inside of the third finger of the right hand.



Figure 2. Blisters on the inside of the second finger of the left hand.

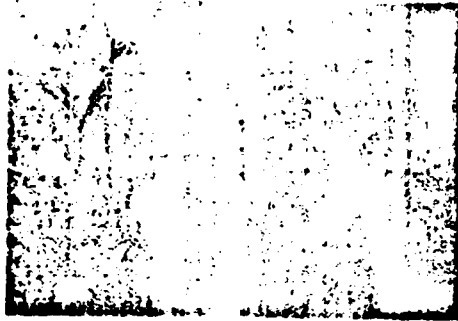


Figure 3. Blisters on the palm side of fingers.

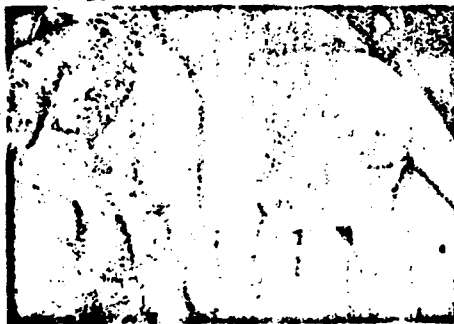


Figure 4. Blisters on palms. Injury visible on the right thumb.



Figure 5. Result of scarification reaction on the paws of a guinea pig.